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SUBJECT: NORWAY AIMING TO BE A GLOBAL RENEWABLE ENERGY LEADER:
OPPORTUNITIES FOR THE U.S.

SUMMARY

1. (SBU) Norway, the oil and gas giant of northern Europe, is working to become a leader in global renewable energy technology and cleaner fossil fuel production. Norway's renewable energy field, though lagging behind other European nations, has found niches to fill in wind power production, solar power technology, and carbon capture and storage (CCS). The Norwegian government, which set the ambitious target of being carbon neutral by 2050, is driving CCS for gas-fired plants though it may need to do more to push Norway to the top of the renewable class. Currently, Norway's vast hydropower resources are the only cost effective form of renewable energy at home but growing public interest in climate change, forward-looking private energy firms, and increased state-sponsored development may make Norway one country to watch in the future of climate change technology combatants. Common interests and complementarity offer excellent opportunities for U.S. companies and government-to-government cooperation. End Summary.

A LATECOMER TO THE RENEWABLE SCENE

2. (U) Norway still lags behind other European nations in the development of "new" renewable energy in large part because of its historic and natural abundance of hydropower which currently provides the country with over 95% of its energy needs. Since hydropower began to flourish after World War II, Norway has had little motivation to pursue other renewables because its existing hydro resources were vast, clean, and efficient. The Norwegian hydro experience has made it a leading world expert in this technology which it exports to developing nations, but has also limited the need to develop other forms of renewable energy. Norway also lacked the financial incentive to seek out new forms of energy because of its oil and gas wealth. The country exports nearly all of its oil and gas production making it the world's fifth largest oil exporter and the third largest gas exporter.

WIND: NORWAY'S HIDDEN POTENTIAL

3. (U) Long coastlines and powerful winds, especially in northern Norway, give the nation a huge potential for future wind power. Finnmark has been identified as an ideal location for wind parks and could double the average energy production of existing Norwegian turbines. Though Norwegian wind technology can not yet compete with wind powers such as Denmark, industry experts indicate that Norway could become the largest source of wind power in Europe. Over the next ten years, the Norwegian wind power industry will largely focus on developing shallow offshore turbines in water 15 to 20 meters deep. Meanwhile, energy companies such as StatoilHydro, the Norwegian national energy champion, are developing deep offshore wind power, hoping to build on the existing technology and expertise

used in offshore oil and gas platforms. Many companies working on this technology are hoping that high carbon taxes and other government mechanisms to reduce emissions will make wind power economical.

UTSIRA, A COMBINATION OF WIND AND HYDROGEN

14. (U) The small island of Utsira, situated off Norway's southwestern coast, runs entirely off of wind power and claims to be the world's first full-scale system for cleanly transforming surplus wind power into hydrogen. StatoilHydro led the project and installed two 40 meter windmills which power the island community. Surplus wind-generated energy is passed through water and, using electrolysis, the hydrogen atoms are separated from the oxygen atoms that make up water molecules. The hydrogen is then compressed and stored in a container that can hold enough hydrogen gas to cover the energy needs of the ten households for two windless days. Though this project was incredibly expensive, StatoilHydro states that this is proof that communities can be self-sufficient based on renewable energy. Companies like StatoilHydro foresee a future in which offshore oil and gas platforms are powered by wind turbines and thus cleaner.

WIND POWER FACING HURDLES

15. (U) Wind power has provoked wide debate in Norway and faces bureaucratic and funding obstacles that may slow progress. The governmental process to receive a permit for a wind park is slow, congested, and locations in northern Norway that would be ideal for wind parks are usually not highly prioritized. Many companies have difficulty attracting investors because wind power is not yet

profitable, and the government is not providing sufficient funding or subsidizing programs that would provide financial security and motivation. Aside from not being commercially viable, wind power has drawn criticism from the Norwegian public for environmental and esthetic reasons. Environmental groups worry that wind parks will affect the nesting and reeding patterns of birds while local communities point to noise pollution and the negative impact turbines will have on the natural scenery. These obstacles have led to greater focus on offshore installations.

16. (U) Offshore technology for floating turbines, however, is more complex and faces its own challenges. Construction and maintenance on offshore wind power will be difficult and expensive because of high waves and unpredictable weather making some turbines inaccessible for most of the year. Turbines will also need to be sturdier than existing technology. For example, current Danish turbine models often break down under stronger Norwegian winds. Furthermore, there is also no existing energy grid for offshore wind parks. Nonetheless, some Norwegian companies, such as StatoilHydro and Statkraft, the Norwegian state-owned electricity company, are pursuing this technology because they recognize the immense potential along the Norwegian shores.

SOLAR: LOOKING TO EXPORT EXPERTISE

17. (SBU) Despite having no domestic market for solar power, Norwegian firms are making advances in solar technology with an eye toward global markets. Norway does not have a sufficient amount of sun to establish a domestic market; however its strong metal and silicon industry has provided the expertise and material needed for commercial development of solar cells and panels. Norwegian companies, such as solar leader REC, also have an edge because they have access to cheap and clean hydro energy. They have been successful in solar markets in Germany and Japan where governmental subsidies exist. REC executives also are expanding in Spain because of its generous subsidy structure. India, Greece, Saudi Arabia, and Singapore are all interested in Norwegian solar power technology and industry experts also point to China and India, where many citizens are not connected to a grid, as potential consumers of single, standalone systems. Industry giants such as REC are realistic, and recognize that state subsidies are crucial to their success, if not existence. Thus, subsidies and tax breaks motivate REC's global expansion plans. For example, corporate executives confirm that

selecting Singapore as the spot for the company's massive, multi-billion dollar campus was largely based on tax breaks and government incentives.

A FOCUS ON CARBON CAPTURE AND STORAGE (CCS)

¶18. (U) CCS is a pillar of Norway's climate change strategy and a way for Norway to make its enormous gas production more environmentally friendly. This technology separates carbon emitted from gas- or coal-fired power plants and stores it in underground aquifers, though it can also be stored in containers. Domestic pressure over the carbon emitted by Norway's gas-fired power plants and the center-left coalition government's stance against the construction of new plants led to the focus on CCS. CCS in Norway is for gas-fired plants, not coal plants, and is extremely expensive and complex. Thus, CCS for gas-fired plants in Norway is propped up by the government. There are currently two gas-fired power plants where this technology is being tried and tested.

¶19. (U) The Ministry of Petroleum and Energy and StatoilHydro have been working since 2006 to establish a full scale CCS project at the gas-fired power plant Mongstad. This capture and storage facility is planned to be operational by 2014. A second full-scale CCS plant is planned at Krstx which will store 1 million tons of CO2 in geological formations under the seabed. It will open no sooner than 2011-2012. Some energy experts argue that these two research projects alone will not be sufficient to make the technical advances needed for CCS technology in gas-fired plants to be economically viable. That said, the objectives of this research are to gain CCS expertise, prove it can be done in gas-fired plants, and later export this technology to coal-fired plants as well.

¶110. (U) Some environmental groups have criticized Norway's CCS efforts arguing that funds should be put solely towards renewable energy so as not to continue the use of fossil fuels. The government, however, is confident that CCS is the only way to reduce emissions from coal- and gas-fired plants which will continue to provide a substantial part of the world's energy needs for coming decades. Safety concerns over possible leaks have also sparked questions of future liability. Another concern is that CCS for gas-fired plants is too expensive to pursue. Coal-fired CCS plants

are more efficient than gas-fired ones because they have a higher amount of CO2 which creates a greater pressure and makes extracting the CO2 easier.

OTHER RENEWABLES ENTERING THE MIX

¶11. (U) Norwegian energy companies are also focusing on a variety of lesser known renewable energy projects including biofuel, osmotic power, tidal power, hydrogen power, electric cars, and new nuclear technology. Norway's large pulp and paper industry have led to the development of biomass and biofuel. This type of energy is being tried in heating, automobiles, ferries, and ships. One Norwegian non-governmental organization, Zero, is working to convert an entire ferry to run on biofuels within the next year. Zero has also worked to establish a second generation biofuel plant at Rovderudmyra near Lillehammer which will be the first plant in the world to produce synthetic biodiesel from landfill gas alone. The plant will be finished in 2010-2011 and is projected to produce about 500,000 liters of synthetic diesel annually. The Norwegian Research Council provided a grant of over one million dollars to this effort.

¶12. (U) Electric cars, though few in Norway, are also getting attention. The government provides lower tax rates for these cars and special provisions to allow them to drive in the bus lane. There are plans to install electric car fuelling stations along the route from Oslo to Bergen to promote this technology. Think, one of the world's largest electric car producers, is based in Norway. Think uses innovative production techniques, developing electrically powered vehicles able to drive 180 km on a single charge. The company receives financial backing and technological support from American companies, such as General Electric.

¶13. (U) Statkraft is also working on new renewable energy alternatives, and for the past decade has been researching osmotic

power, which is the energy produced when saltwater meets freshwater.

Statkraft is planning to construct the world's first prototype osmotic power plant and the company's projections show that the technology could produce 1,600 terra watts of electricity worldwide-13 times the amount of hydropower produced in Norway annually.

¶14. (U) On the nuclear end of the spectrum, Norwegian researchers from the University of Bergen are studying the use of thorium as a safer and more efficient alternative nuclear fuel to uranium. Norway has an estimated 180,000 tons of thorium.

NO MAJOR POLITICAL SPLITS OVER RENEWABLES

¶15. (SBU) Norway's energy policy is driven by a general political consensus among all but one of the major parties. Norway recognizes the importance of its oil and gas wealth as well as its expertise and success with hydropower. It has a strong political interest in climate change. As a result, there is a strong desire to develop clean solutions to balance carbon emissions from its oil and gas industry. Thus, the September 2009 parliamentary election is unlikely to spark any major change in Norway's growing renewable energy focus. Indeed, two parties, the Social Left (SV) and Venstre are likely to push the environment as an important issue in their campaigns. Since these two small parties are likely to be needed as coalition parties in a left or right wing government, their interest may force the other parties to be even more supportive of the renewables than they otherwise might be.

¶16. (SBU) Within the current Red-Green coalition government, in power since 2005, SV is opposed to the construction of new hydropower plants for fear that they will destroy natural ecosystems and negatively impact the environment. As a result, the government has taken the stance that no new major hydro plants will be built, only small-scale hydro systems have been allowed recently. This was a concession to SV by Prime Minister Jens Stoltenberg's Labor Party in return for being able to explore the potential of the Snoevhit oil and gas field in the Barents Sea, something SV opposed. SV was also against the construction of new gas-fired plants unless they had CCS technology and are a driving force behind the government's push for CCS. While SV would like to see Norway diversify its energy production away from oil and gas, the other coalition members (Labor Party and Center Party) see Norway's petroleum prominence as a long-term guarantee of the welfare state. They, along with opposition parties, nonetheless place importance on the need to reduce emissions and find ways to clean up petroleum production.

¶17. (SBU) Thus, renewable energy is generally not a contentious issue, with most major parties in and outside of the coalition agreeing that renewables need to be a part of Norway's energy

strategy. The Progress Party, the only party to openly debate the threat of climate change and oppose Norwegian participation in the Kyoto Protocol, stands little chance of slowing Norway's renewable energy efforts against such strong popular support even if it manages to make it into the government in 2009. Progress, in fact, would also favor pushing new technologies although emphasizing the private sector vs. governmental.

NORWEGIAN PUBLIC GROWING MORE CLIMATE CONSCIOUS

¶18. (U) Norwegian government officials and energy experts have noticed a shift in the Norwegian public in the past few years towards a more emission-conscious approach to energy policy. This change has been attributed to the spotlight on the Nobel Peace Prize being given to both the UN's Intergovernmental Panel on Climate Change and Al Gore for their efforts on the threat of climate change, growing international awareness, Norwegian CO2 taxes, and a growing feeling of responsibility for Norway's large emissions originating from the petroleum industry. While Norway prides itself with one of the cleanest oil and gas production systems in the world, Norwegians see a paradox in their efforts to reduce global emissions while being some of the world's largest emitters. The public is growing more open to using oil wealth to combat climate change and supports holding the oil companies more accountable. The Norwegian population has served as a driving force behind domestic

commercial interest in going green.

U.S. MARKET PROMISING FOR NORWEGIAN RENEWABLE TECHNOLOGY

¶19. (U) Many Norwegian energy firms are looking to the U.S. as a very promising market for their cutting-edge technologies, especially in the fields of solar power and CCS. REC Solar is active in the U.S. and is confident that the American market will be very profitable. According to REC, the U.S. is an ideal market because of ample amounts of sun, existing high electricity prices, and unbalanced power grids. Solar energy can be consumed where it is produced which would help equalize existing imbalances in American electricity grids. REC currently has solar manufacturing plants in Montana and Utah, and there are plans for a polysilicon plant to be built in Moses Lake, Washington.

¶20. (U) Another Norwegian energy company, Sargas, which focuses on CCS technology for coal-fired power plants, sees the U.S. market as the most promising for its services because it thinks more companies there want to go green. Sargas is looking to establish an office on the American east coast within the next year and is exploring future cooperation with coal plants in Pennsylvania and with the North American Power Corporation in Wyoming. Sargas sees great opportunities to export its technology to the many American coal-fired plants.

NORWAY'S AMBITIOUS CLIMATE CHANGE STRATEGY HELPS ITS RENEWABLE COMPANIES

¶21. (U) Norway, emitting about 55 million tons of carbon a year, has developed the most ambitious emission reduction targets in the world and hopes to become the example of how to succeed under the Kyoto Protocol and beyond. Through a combination of both domestic emission cuts and offsets, Norway plans to be carbon neutral by 2030, 20 years earlier than its original 2050 target set last year, overfill its Kyoto obligations by 10 percent during the 2008-2012 period, and cut a further 10 million tons of emission per year by ¶2020. Norway's 2020 target will be met with almost two thirds of the cuts being made in Norway while its Kyoto Protocol objective of an additional 10 percent cut will be met entirely with reductions outside of Norway. The development of an international carbon regime and the success of the Clean Development Mechanism (CDM) under the Kyoto Protocol are cornerstones of Norway's climate change strategy. Under the CDM, Norway can invest in projects that reduce emissions in developing countries as an alternative to more expensive domestic emission reduction. Despite Norway's ambitious goals, critics argue that there is "a lot of talk with little action" and that the January 2008 White Paper on climate change, despite setting stricter targets, did not provide enough specific solutions.

¶21. (SBU) Private firms within Norway are banking on the development of an international carbon regime to provide the necessary incentives to stimulate a market in clean energy technology. If they come to pass, Norway sees the opportunity for great success in areas where Norwegian firms have a unique competence, such as hydropower, solar power, and eventually CCS. The GON is promoting international efforts that will further support their businesses.

For example, the Norwegian Agency for Development Cooperation, a directorate under the Norwegian Ministry of Foreign Affairs, is working in China on cleaner coal production programs using new filter techniques. Norwegian business will also be connected to the EU Emissions Trading Scheme EU-ETS this year. The Government expects to supply significantly fewer allowances to the trading system than the total of expected emissions from the Norwegian companies that will be linked to the EU-ETS. Thus, the Norwegian allocations will contribute to scarcity of allowances in the system thereby helping their business.

COMMENT

¶22. (SBU) The Embassy has been working closely with the Ministry of Environment and private sector organizers to showcase American renewable expertise to promote possible joint research efforts and

joint business ventures. We believe there are some natural Norwegian strengths in fields such as Carbon Capture and Storage and wind technology that make such cooperation valuable to both parties. Furthermore, our efforts to explain the advanced state of U.S. renewable research and technology have had a beneficial public diplomacy impact, causing more Norwegians to acknowledge U.S. environmental efforts and leadership.

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